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Filer:	Sabrina Savala
Organization:	AltaGas Pomona Energy, Inc.
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Appendix 4.1I
Non-Criteria Pollutant Emission
Calculations

**Table 4.11-1
Pomona Repower Project
Non-Criteria Pollutant Emission Calculations New Gas Turbine (Hourly Emissions)**

Pollutant	Uncontrolled		Normal Oper. Controlled		Worst Case Startup/Shutdown VOC Emiss. Vs.	Startup/Shutdown Emission Factor(4) (lbs/MMBtu)	Commissioning Emission Factor(5) (lbs/MMBtu)	New GT Max. Firing Rate (MMBtu/hr)	New GT Normal Oper. Emissions (lbs/hr)	New GT Startup/Shutdown Emissions (lbs/hr)	New GT Commissioning Emissions (lbs/hr)
	Emission Factor (lbs/MMBtu)	Basis	Emission Factor (lbs/MMBtu)	Normal Operation VOC Emiss.(4) (lbs/hr)/(lbs/hr)	Normal Operation VOC Emiss.(4) (lbs/hr)/(lbs/hr)						
Ammonia	6.81E-03	Permit Limit(3)	6.81E-03	3.13	3.13	6.81E-03		959	6.53E+00	6.53E+00	6.53E+00
Propylene	7.56E-04	0.5*CATEF(2)	3.78E-04	3.13	3.13	1.18E-03	7.56E-04	959	3.63E-01	1.14E+00	7.25E-01
Hazardous Air Pollutants (HAPs) - Federal											
Acetaldehyde	4.00E-05	0.5*AP-42(1)	2.00E-05	3.13	3.13	6.26E-05	4.00E-05	959	1.92E-02	6.01E-02	3.84E-02
Acrolein	6.42E-06	0.5*AP-42(1)	3.21E-06	3.13	3.13	1.00E-05	6.42E-06	959	3.08E-03	9.64E-03	6.16E-03
Benzene	1.20E-05	0.5*AP-42(1)	5.99E-06	3.13	3.13	1.88E-05	1.20E-05	959	5.75E-03	1.80E-02	1.15E-02
1,3-Butadiene	4.30E-07	0.5*AP-42(1)	2.15E-07	3.13	3.13	6.73E-07	4.30E-07	959	2.06E-04	6.46E-04	4.13E-04
Ethylbenzene	3.20E-05	0.5*AP-42(1)	1.60E-05	3.13	3.13	5.01E-05	3.20E-05	959	1.54E-02	4.81E-02	3.07E-02
Formaldehyde	9.00E-04	0.5*CATEF(2)	4.50E-04	3.13	3.13	1.41E-03	9.00E-04	959	4.32E-01	1.35E+00	8.63E-01
Hexane, n-	2.54E-04	0.5*CATEF(2)	1.27E-04	3.13	3.13	3.98E-04	2.54E-04	959	1.22E-01	3.81E-01	2.44E-01
Naphthalene	1.31E-06	0.5*AP-42(1)	6.53E-07	3.13	3.13	2.04E-06	1.31E-06	959	6.27E-04	1.96E-03	1.25E-03
Total PAHs (listed individually below)	6.43E-07	SUM	3.22E-07	3.13	3.13	1.01E-06	6.43E-07	959	3.09E-04	9.66E-04	6.17E-04
Acenaphthene	1.86E-08	0.5*CATEF(2)	9.32E-09	3.13	3.13	2.92E-08	1.86E-08	959	8.94E-06	2.80E-05	1.79E-05
Acenaphthylene	1.44E-08	0.5*CATEF(2)	7.21E-09	3.13	3.13	2.26E-08	1.44E-08	959	6.92E-06	2.17E-05	1.38E-05
Anthracene	3.32E-08	0.5*CATEF(2)	1.66E-08	3.13	3.13	5.20E-08	3.32E-08	959	1.59E-05	4.99E-05	3.19E-05
Benzo(a)anthracene	2.22E-08	0.5*CATEF(2)	1.11E-08	3.13	3.13	3.48E-08	2.22E-08	959	1.06E-05	3.33E-05	2.13E-05
Benzo(a)pyrene	1.36E-08	0.5*CATEF(2)	6.82E-09	3.13	3.13	2.14E-08	1.36E-08	959	6.54E-06	2.05E-05	1.31E-05
Benzo(e)pyrene	5.34E-10	0.5*CATEF(2)	2.67E-10	3.13	3.13	8.36E-10	5.34E-10	959	2.56E-07	8.02E-07	5.12E-07
Benzo(b)fluoranthrene	1.11E-08	0.5*CATEF(2)	5.54E-09	3.13	3.13	1.73E-08	1.11E-08	959	5.32E-06	1.66E-05	1.06E-05
Benzo(k)fluoranthrene	1.08E-08	0.5*CATEF(2)	5.40E-09	3.13	3.13	1.69E-08	1.08E-08	959	5.18E-06	1.62E-05	1.04E-05
Benzo(g,h,i)perylene	1.34E-08	0.5*CATEF(2)	6.72E-09	3.13	3.13	2.10E-08	1.34E-08	959	6.45E-06	2.02E-05	1.29E-05
Chrysene	2.48E-08	0.5*CATEF(2)	1.24E-08	3.13	3.13	3.88E-08	2.48E-08	959	1.19E-05	3.72E-05	2.38E-05
Dibenz(a,h)anthracene	2.30E-08	0.5*CATEF(2)	1.15E-08	3.13	3.13	3.60E-08	2.30E-08	959	1.10E-05	3.45E-05	2.21E-05
Fluoranthene	4.24E-08	0.5*CATEF(2)	2.12E-08	3.13	3.13	6.64E-08	4.24E-08	959	2.03E-05	6.37E-05	4.07E-05
Fluorene	5.70E-08	0.5*CATEF(2)	2.85E-08	3.13	3.13	8.92E-08	5.70E-08	959	2.73E-05	8.56E-05	5.47E-05
Indeno(1,2,3-cd)pyrene	2.30E-08	0.5*CATEF(2)	1.15E-08	3.13	3.13	3.60E-08	2.30E-08	959	1.10E-05	3.45E-05	2.21E-05
Phenanthrene	3.08E-07	0.5*CATEF(2)	1.54E-07	3.13	3.13	4.82E-07	3.08E-07	959	1.48E-04	4.63E-04	2.96E-04
Pyrene	2.72E-08	0.5*CATEF(2)	1.36E-08	3.13	3.13	4.26E-08	2.72E-08	959	1.30E-05	4.09E-05	2.61E-05
Propylene oxide	2.90E-05	0.5*AP-42(1)	1.45E-05	3.13	3.13	4.54E-05	2.90E-05	959	1.39E-02	4.36E-02	2.78E-02
Toluene	1.31E-04	0.5*AP-42(1)	6.53E-05	3.13	3.13	2.04E-04	1.31E-04	959	6.27E-02	1.96E-01	1.25E-01
Xylene	6.40E-05	0.5*AP-42(1)	3.20E-05	3.13	3.13	1.00E-04	6.40E-05	959	3.07E-02	9.61E-02	6.14E-02

Notes:

- (1) AP-42, Table 3.1-3, 4/00.
- (2) From CARB CATEF database (converted from lbs/MMscf to lbs/MMBtu based on site natural gas HHV).
- (3) Based on 5 ppm ammonia slip from SCR system.
- (4) Controlled emission factor adjusted upward based on VOC emission ratio - as required by SDAPCD for the Pio Pico Energy Center and the Amended Carlsbad Energy Center Project.
- (5) Based on uncontrolled emission factors - as required by SDAPCD for the Pio Pico Energy Center and the Amended Carlsbad Energy Center Project.

**Table 4.1I-2
Pomona Repower Project
Non-Criteria Pollutant Emissions New Gas Turbine (Annual Emissions)**

Pollutant	New Gas Turbine Normal Operating Hours (hrs/yr)	New Gas Turbine Startup/Shutdown Hours (hrs/yr)	New Gas Turbine Commissioning Hours (hrs/yr)	New Gas Turbine(1) Annual Emissions (tons/yr)	New Gas Turbine Annual Commissioning Emissions (tons/yr)
Ammonia	2,800	1,000	207	12.41	0.68
Propylene	2,800	1,000	207	1.08	0.08
Hazardous Air Pollutants (HAPs) - Federal					
Acetaldehyde	2,800	1,000	207	0.057	0.004
Acrolein	2,800	1,000	207	0.009	0.001
Benzene	2,800	1,000	207	0.017	0.001
1,3-Butadiene	2,800	1,000	207	0.001	0.000
Ethylbenzene	2,800	1,000	207	0.046	0.003
Formaldehyde	2,800	1,000	207	1.280	0.089
Hexane, n-	2,800	1,000	207	0.361	0.025
Naphthalene	2,800	1,000	207	0.002	0.000
Total PAHs (listed individually below)	2,800	1,000	207	0.001	0.000
Acenaphthene	2,800	1,000	207	0.000	0.000
Acenaphthylene	2,800	1,000	207	0.000	0.000
Anthracene	2,800	1,000	207	0.000	0.000
Benzo(a)anthracene	2,800	1,000	207	0.000	0.000
Benzo(a)pyrene	2,800	1,000	207	0.000	0.000
Benzo(e)pyrene	2,800	1,000	207	0.000	0.000
Benzo(b)fluoranthrene	2,800	1,000	207	0.000	0.000
Benzo(k)fluoranthrene	2,800	1,000	207	0.000	0.000
Benzo(g,h,i)perylene	2,800	1,000	207	0.000	0.000
Chrysene	2,800	1,000	207	0.000	0.000
Dibenz(a,h)anthracene	2,800	1,000	207	0.000	0.000
Fluoranthene	2,800	1,000	207	0.000	0.000
Fluorene	2,800	1,000	207	0.000	0.000
Indeno(1,2,3-cd)pyrene	2,800	1,000	207	0.000	0.000
Phenanthrene	2,800	1,000	207	0.000	0.000
Pyrene	2,800	1,000	207	0.000	0.000
Propylene oxide	2,800	1,000	207	0.041	0.003
Toluene	2,800	1,000	207	0.186	0.013
Xylene	2,800	1,000	207	0.091	0.006
Total (HAPs) =				2.09	0.15
Total (All) =				15.58	0.90

Notes:

(1) Includes startup/shutdown emissions.

Table 4.1I-3
Pomona Repower Project
Non-Criteria Pollutant Emissions for Cooling Tower

Compound	Cooling Tower Water		Cooling Tower Water Drift (gals/hr)	Concentration in RECLAIM Water ¹	Units	Hourly Cooling Tower Emissions (lbs/hr)	Annual Cooling		
	Circulation Rate (gal/min)	Cooling Tower Drift Rate					Tower Emissions (tons/yr)	Hourly Per Cell Emissions (g/sec)	Annual Per Cell Emissions (g/sec)
1,2-Dichloroethane	7,000	0.0005%	2.10	36.00	ug/l	4.40E-08	0.00	2.77E-09	1.20E-09
4-Bromofluorobenzene	7,000	0.0005%	2.10	29.30	ug/l	3.58E-08	0.00	2.26E-09	9.79E-10
Bromodichloromethane	7,000	0.0005%	2.10	20.00	ug/l	2.45E-08	0.00	1.54E-09	6.69E-10
Bromoform	7,000	0.0005%	2.10	0.84	ug/l	1.03E-09	0.00	6.47E-11	2.81E-11
Chloroform	7,000	0.0005%	2.10	23.70	ug/l	2.90E-08	0.00	1.83E-09	7.92E-10
Dibromochloromethane	7,000	0.0005%	2.10	33.40	ug/l	4.09E-08	0.00	2.57E-09	1.12E-09
Methylene Chloride	7,000	0.0005%	2.10	0.26	ug/l	3.18E-10	0.00	2.00E-11	8.69E-12
Toluene	7,000	0.0005%	2.10	29.70	ug/l	3.63E-08	0.00	2.29E-09	9.93E-10
Total Trihalomethanes	7,000	0.0005%	2.10	51.40	ug/l	6.29E-08	0.00	3.96E-09	1.72E-09
Calcium	7,000	0.0005%	2.10	191.00	mg/l	2.34E-04	0.00	1.47E-05	6.38E-06
Magnesium	7,000	0.0005%	2.10	68.00	mg/l	8.32E-05	0.00	5.24E-06	2.27E-06
Iron	7,000	0.0005%	2.10	0.02	mg/l	2.45E-08	0.00	1.54E-09	6.69E-10
Copper	7,000	0.0005%	2.10	0.02	mg/l	2.45E-08	0.00	1.54E-09	6.69E-10
Zinc	7,000	0.0005%	2.10	0.08	mg/l	9.79E-08	0.00	6.16E-09	2.67E-09
Potassium	7,000	0.0005%	2.10	17.00	mg/l	2.08E-05	0.00	1.31E-06	5.68E-07
Barium	7,000	0.0005%	2.10	0.04	mg/l	4.89E-08	0.00	3.08E-09	1.34E-09
Strontium	7,000	0.0005%	2.10	0.48	mg/l	5.87E-07	0.00	3.70E-08	1.60E-08
Fluoride	7,000	0.0005%	2.10	0.38	mg/l	4.65E-07	0.00	2.93E-08	1.27E-08
Silica	7,000	0.0005%	2.10	24.00	mg/l	2.94E-05	0.00	1.85E-06	8.02E-07
Phosphate	7,000	0.0005%	2.10	2.10	mg/l	2.57E-06	0.00	1.62E-07	7.02E-08
Chloride	7,000	0.0005%	2.10	157.00	mg/l	1.92E-04	0.00	1.21E-05	5.25E-06

Notes:

(1) Based on maximum measured level in RECLAIM water for tests performed during the period from 12/2014 to 12/2015.

**Table 4.1I-4
Pomona Repower Project
Non-Criteria Pollutant Emission Calculations Existing Gas Turbine Potential to Emit (Hourly Emissions)**

Pollutant	Uncontrolled	Basis	Existing GT and DB	Existing GT and DB
	Emission Factor (lbs/MMBtu)		Max. Firing Rate (MMBtu/hr)	Normal Oper. Emissions (lbs/hr)
Ammonia	6.81E-03	Permit Limit(3)	584	3.98E+00
Propylene	7.56E-04	CATEF(2)	584	4.41E-01
Hazardous Air Pollutants (HAPs) - Federal				
Acetaldehyde	4.00E-05	AP-42(1)	584	2.34E-02
Acrolein	6.42E-06	AP-42(1)	584	3.75E-03
Benzene	1.20E-05	AP-42(1)	584	7.00E-03
1,3-Butadiene	4.30E-07	AP-42(1)	584	2.51E-04
Ethylbenzene	3.20E-05	AP-42(1)	584	1.87E-02
Formaldehyde	9.00E-04	CATEF(2)	584	5.26E-01
Hexane, n-	2.54E-04	CATEF(2)	584	1.48E-01
Naphthalene	1.31E-06	AP-42(1)	584	7.63E-04
Total PAHs (listed individually below)	6.43E-07	SUM	584	3.76E-04
Acenaphthene	1.86E-08	CATEF(2)	584	1.09E-05
Acenaphthylene	1.44E-08	CATEF(2)	584	8.42E-06
Anthracene	3.32E-08	CATEF(2)	584	1.94E-05
Benzo(a)anthracene	2.22E-08	CATEF(2)	584	1.30E-05
Benzo(a)pyrene	1.36E-08	CATEF(2)	584	7.96E-06
Benzo(e)pyrene	5.34E-10	CATEF(2)	584	3.12E-07
Benzo(b)fluoranthrene	1.11E-08	CATEF(2)	584	6.47E-06
Benzo(k)fluoranthrene	1.08E-08	CATEF(2)	584	6.31E-06
Benzo(g,h,i)perylene	1.34E-08	CATEF(2)	584	7.85E-06
Chrysene	2.48E-08	CATEF(2)	584	1.45E-05
Dibenz(a,h)anthracene	2.30E-08	CATEF(2)	584	1.34E-05
Fluoranthene	4.24E-08	CATEF(2)	584	2.48E-05
Fluorene	5.70E-08	CATEF(2)	584	3.33E-05
Indeno(1,2,3-cd)pyrene	2.30E-08	CATEF(2)	584	1.34E-05
Phenanthrene	3.08E-07	CATEF(2)	584	1.80E-04
Pyrene	2.72E-08	CATEF(2)	584	1.59E-05
Propylene oxide	2.90E-05	AP-42(1)	584	1.69E-02
Toluene	1.31E-04	AP-42(1)	584	7.63E-02
Xylene	6.40E-05	AP-42(1)	584	3.74E-02

Notes:

- (1) AP-42, Table 3.1-3, 4/00.
- (2) From CARB CATEF database (converted from lbs/MMscf to lbs/MMBtu based on site natural gas HHV).
- (3) Based on 5 ppm ammonia slip from SCR system.

**Table 4.1I-5
Pomona Repower Project
Non-Criteria Pollutant Emissions Existing Gas Turbine Potential to Emit (Annual Emissions)**

Pollutant	Existing Gas Turbine Normal Operating Hours (hrs/yr)	Existing Gas Turbine Annual Emissions (tons/yr)
Ammonia	8,760	17.41
Propylene	8,760	1.93
Hazardous Air Pollutants (HAPs) - Federal		
Acetaldehyde	8,760	0.10
Acrolein	8,760	0.02
Benzene	8,760	0.03
1,3-Butadiene	8,760	0.00
Ethylbenzene	8,760	0.08
Formaldehyde	8,760	2.30
Hexane, n-	8,760	0.65
Naphthalene	8,760	0.00
Total PAHs (listed individually below)	8,760	0.00
Acenaphthene	8,760	0.00
Acenaphthylene	8,760	0.00
Anthracene	8,760	0.00
Benzo(a)anthracene	8,760	0.00
Benzo(a)pyrene	8,760	0.00
Benzo(e)pyrene	8,760	0.00
Benzo(b)fluoranthrene	8,760	0.00
Benzo(k)fluoranthrene	8,760	0.00
Benzo(g,h,i)perylene	8,760	0.00
Chrysene	8,760	0.00
Dibenz(a,h)anthracene	8,760	0.00
Fluoranthene	8,760	0.00
Fluorene	8,760	0.00
Indeno(1,2,3-cd)pyrene	8,760	0.00
Phenanthrene	8,760	0.00
Pyrene	8,760	0.00
Propylene oxide	8,760	0.07
Toluene	8,760	0.33
Xylene	8,760	0.16
Total (HAPs) =		3.76
Total (All) =		23.11

Table 4.11-6

Pomona Repower Project

Non-Criteria Pollutant Emissions New Gas Turbine (Modeling Inputs)

Pollutant	For Acute Modeling	For Acute Modeling	For Acute Modeling	For Chronic/Cancer Risk
	Hourly Normal Oper. Emission Rate (g/sec)	Hourly Startup/Shutdown Emission Rate (g/sec)	Hourly Commissioning Emission Rate (g/sec)	Modeling Annual Normal Oper. Emission Rate(1) (g/sec)
Ammonia	8.23E-01	8.23E-01	8.23E-01	3.57E-01
Propylene	4.57E-02	1.43E-01	9.14E-02	3.09E-02
Hazardous Air Pollutants (HAPs) - Federal				
Acetaldehyde	2.42E-03	7.57E-03	4.84E-03	1.64E-03
Acrolein	3.88E-04	1.21E-03	7.76E-04	2.63E-04
Benzene	7.24E-04	2.27E-03	1.45E-03	4.90E-04
1,3-Butadiene	2.60E-05	8.14E-05	5.20E-05	1.76E-05
Ethylbenzene	1.93E-03	6.06E-03	3.87E-03	1.31E-03
Formaldehyde	5.44E-02	1.70E-01	1.09E-01	3.68E-02
Hexane, n-	1.54E-02	4.81E-02	3.07E-02	1.04E-02
Naphthalene	7.89E-05	2.47E-04	1.58E-04	5.34E-05
Total PAHs (listed individually below)	3.89E-05	1.22E-04	7.78E-05	2.63E-05
Acenaphthene	1.13E-06	3.53E-06	2.25E-06	7.63E-07
Acenaphthylene	8.72E-07	2.73E-06	1.74E-06	5.90E-07
Anthracene	2.01E-06	6.28E-06	4.01E-06	1.36E-06
Benzo(a)anthracene	1.34E-06	4.20E-06	2.68E-06	9.08E-07
Benzo(a)pyrene	8.24E-07	2.58E-06	1.65E-06	5.58E-07
Benzo(e)pyrene	3.23E-08	1.01E-07	6.46E-08	2.19E-08
Benzo(b)fluoranthrene	6.70E-07	2.10E-06	1.34E-06	4.53E-07
Benzo(k)fluoranthrene	6.53E-07	2.04E-06	1.31E-06	4.42E-07
Benzo(g,h,i)perylene	8.12E-07	2.54E-06	1.62E-06	5.50E-07
Chrysene	1.50E-06	4.69E-06	3.00E-06	1.01E-06
Dibenz(a,h)anthracene	1.39E-06	4.35E-06	2.78E-06	9.41E-07
Fluoranthene	2.56E-06	8.02E-06	5.13E-06	1.74E-06
Fluorene	3.45E-06	1.08E-05	6.89E-06	2.33E-06
Indeno(1,2,3-cd)pyrene	1.39E-06	4.35E-06	2.78E-06	9.41E-07
Phenanthrene	1.86E-05	5.83E-05	3.72E-05	1.26E-05
Pyrene	1.64E-06	5.15E-06	3.29E-06	1.11E-06
Propylene oxide	1.75E-03	5.49E-03	3.51E-03	1.19E-03
Toluene	7.89E-03	2.47E-02	1.58E-02	5.34E-03
Xylene	3.87E-03	1.21E-02	7.74E-03	2.62E-03

Notes:

(1) Includes startup/shutdown emissions.